

AIR WAR COLLEGE

AIR UNIVERSITY

INTERNATIONAL ACQUISITION PROGRAMS:
VARIABLES BEYOND COST, SCHEDULE AND PERFORMANCE

by

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Biography

Lt Col David Chace is assigned to the Air War College, Air University, Maxwell AFB, Alabama. He is a graduate of the United States Air Force Academy with a Bachelor of Science Degree in Human Factors Engineering and a Masters of Operational Art and Science from Air Command and Staff College. He is a command pilot with more than 2000 hours in the F-16 and flying assignments in Air Education and Training Command, Air Combat Command, Pacific Air Forces, United States Air Forces Europe and Air Forces Central Command.



Abstract

Due to rising fighter aircraft acquisition costs and constrained defense budgets, the Department of Defense is looking for effective and efficient acquisition practices that will deliver the necessary capability to the armed forces within the fiscal constraints. One acquisition practice directed to combat the rising cost is international acquisition programs. Cost, schedule, and performance are the traditional variables used when measuring program success and managing acquisition program risk. However, measuring international acquisition programs with only the traditional variables of cost, schedule and performance would be an incomplete analysis. Leaders of international acquisition programs must consider the additional variables of international economic impact, industrial base, technology transfer, and international relations. These variables should be considered when measuring risk throughout the life cycle of the program and a consideration when evaluating the program performance.

The F-35 is the Department of Defense's largest and most important acquisition program. Its success is of fundamental importance to our national security... For our international partners and foreign military sales customers, the JSF will become a linchpin for future coalition operations, will help to close crucial capability gaps, and will enhance the strength of our security alliances.

*Mr. Frank Kendall
Lieutenant General Christopher Bogdan
19 June 2013*

Introduction

The Department of Defense is constantly looking for effective and efficient acquisition practices that will deliver the armed forces' required capabilities within given fiscal constraints; this is particularly true in today's budget environment, given the compounding issues of rising fighter aircraft acquisition program costs and increasingly constrained defense budgets.

International acquisition programs are one practice the Department has directed to combat these rising costs. In theory, international acquisition programs will save money by sharing the cost of research, development, test, and evaluation (RDT&E), as well as reducing production costs due to the economies of scale. Additionally, international programs may open access to advanced technologies, increase military interoperability between nations and enhance international strategic relationships. However, such programs are not without risk. International programs may detract from the US industrial base, result in the loss of critical technological advantages and increase both system and program management complexity. One must carefully balance the benefits and risks of international acquisition programs to meet the United States' national security objectives.

Cost, schedule, and performance are the traditional variables used when measuring program success and managing acquisition program risk. These variables, often referred to as

the triangle of project management, are at the core of almost every customary program evaluation tool. Program managers establish cost, schedule, and performance goals that serve as control objectives. Program managers are responsible to report progress towards the control objectives and to identify deviations.¹ It is through the lens of cost, schedule and performance objectives one manages program risk and measures program progress. However, measuring international acquisition programs with only these traditional variables would be an incomplete analysis. Leaders and managers of international acquisition programs must take a more holistic approach and consider additional, more strategic variables that go beyond these objective criteria, and consider the subjective benefits and disadvantages that are unique to international programs. These include such issues as the broader international economic impact, the opportunities and threats to an expanded industrial base, similar opportunities and threats to the issue of technology transfer, and a program's impact on international relations at the strategic level. These variables should be considered when measuring risk, as well as performance, throughout the life cycle of a program.

The research for this paper will entail a literature review of source material related to international fighter acquisition programs with an emphasis on the F-16 and F-35 programs.² Source materials include US General Accounting Office reports, Selective Acquisition Reports, Congressional reports, RAND National Defense Research Institute reports and other related acquisition program documents.

Thesis

In addition to the traditional program management variables of cost, schedule, and performance, international acquisition programs must also consider several key program variables that can have strategic implications for the United States, the most significant of which

are multi-national economics, industrial base decisions, technology transfer, and international relations in general.

United States' Strategic Interests in International Acquisition Programs

The United States' national security interests are outlined in the *National Security Strategy* and are directly supported by the military interests delineated in the supporting *National Military Strategy*. International acquisition programs support objectives outlined in both documents. First, the *National Security Strategy* aspires for “a strong, innovative, and growing US economy in an open international economic system that promotes opportunity and prosperity.”³ International acquisition programs open access to additional markets for military equipment sales as well as opportunities to partner with foreign companies. Increased equipment sales due to foreign procurement, as well as international industrial engagement, help both the US economy as well as the larger international economic system.

Secondly, international programs support the national interest by building stronger bonds through cooperation, helping to promote peace and increase security as part of the effort to meet global challenges.⁴ International acquisition programs foster international relations and cooperation through government-to-government engagement as well as industrial engagement for the life-cycle of a weapon system, which can span decades. Large, expensive acquisition programs, like those for aircraft development, involve significant economic commitment and can reinforce partner relationships and further encourage international cooperation. In some instances, international acquisition programs provide a capability to an ally that they would not have been able to develop or afford on their own. Having more capable and interoperable allies further supports the United States' interest of meeting global challenges.

The *National Security Strategy* also emphasizes acquisition reform to eliminate wasteful spending and duplicative programs in search of more cost effective and efficient processes.⁵ International programs offer such opportunities by eliminating duplicative developmental efforts with our allies as well as sharing the cost of such programs. Many of our allies already operate US produced weapon systems and as was in the case of the F-16 and F-35, were looking for opportunities to replace aging systems at the same time as US military services.

The US *National Military Strategy* emphasizes technological superiority and an industrial base that supports the needs of our military services while pursuing cost effective measures.⁶ International acquisition programs open access to other technology markets which may provide capabilities not available domestically, as well as help to promote increased competition. The United States does not have a monopoly on innovation or technology and should seek the best capabilities from the international market.⁷ Additionally, the US military industrial base has decreased over the last half century.⁸ Consequently, this smaller pool of companies may result in less competition in future development programs. Because competition drives innovation and cost saving measures, opening acquisition programs to foreign industries may provide additional competition which can reduce development and production costs.

Additionally, the *National Military Strategy* stresses the need to deepen security relationships with our allies.⁹ International acquisition programs provide common, interoperable equipment to our allies as well as establish working relationships that may last decades. For example, the United States has signed a Memorandum of Understanding with eight nations to continue F-35 follow-on-development for a 45-year period.¹⁰

International acquisition programs are ideal mechanisms to help achieve the US' national security objectives, by producing better military hardware as well as creating and solidifying

international relations; however, if managed too narrowly, these programs could have just the opposite effect. Leaders of international acquisition programs must consider program impacts with regards to the greater international market, international industrial base capacity, technological capabilities of the United States and our allies, and international relations. These additional variables must be part of program risk assessment tools traditionally limited to cost, schedule, and performance tradeoffs. Traditional programs balance cost, schedule, and performance throughout a program life cycle to meet overall program goals. System performance is commonly protected with a resulting increase in cost and delays in program schedule. If a definite performance capability is required, such as to counter a given threat within a specified timeline, programs may accept increased costs; however, with tighter budgets and greater scrutiny of expenditures, programs may be increasingly pressured to sacrifice performance to stay within cost requirements. Programs must continually evaluate and adjust priorities between the variables based on program execution and external influences.

International acquisition programs must add the additional variables of international economic impact, industrial base, technology transfer, and international relations to provide the broader context for traditional program cost-schedule-performance decisions. All the variables must be assessed throughout program execution to meet not only program goals, but goals that consider national interests. For example, the United States may accept additional program cost to strengthen international relations. Similarly, a program may accept less capability or performance to facilitate inclusion of an international participant due to technology transfer limitations. These seven variables should be considered holistically during all phases of program execution, to include the potential for terminating international participation if more advantageous. The diagram in Figure 1 provides a graphical representation of how international

programs should expand their program management risk variables beyond the traditional cost-schedule-performance and include strategic variables that effect national interests. Ultimately, the acquisition system must manage the “nation's investments in technologies, programs, and product support necessary to achieve the *National Security Strategy* and support the US Armed Forces.”¹¹

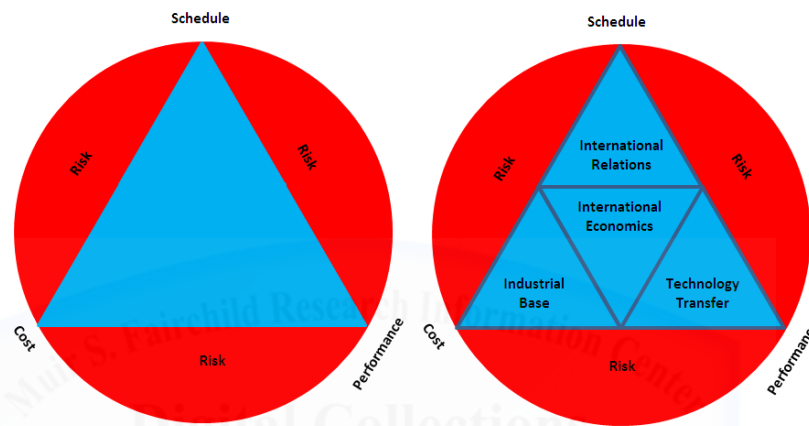


Figure 1: Traditional versus International Program Variables

Economic Considerations in International Acquisition Programs

Economic impact, or program cost, is one of the most common factors assessed and debated in relation to acquisition programs. In the case of international programs, cost is more easily quantifiable than measuring the subjective impacts of technology transfer and international relations. Declining defense procurement budgets associated with rising costs of equipment development and production further put a focus on the economics of acquisition programs and is the impetus behind collaborative international efforts.¹² The annual US defense procurement budget in 1999 was half of the annual procurement budgets in the decade prior. Similar reductions have been seen in European countries.¹³ At the same time there has been a rise in acquisition program costs, specifically in aircraft programs. These costs have increased at a

greater rate than inflation indices.¹⁴ Most cost increases are due to customer-driven variables, such as technical characteristics, procurement rates, and complexity of the airframe.¹⁵ To combat the rising costs and declining budgets, nations have partnered in programs like the F-16 and F-35 and attempted to reap the economic benefits of collaboration, which include: reduced costs by eliminating duplicate efforts like RDT&E and production lines; economies of scale due to larger total program procurement numbers; access to greater aerospace markets for competition and best price; and funding stability due to international influences and return on investment.

International programs should be more economical due to the collaborative efforts of shared RDT&E costs and the benefits of economies of scale. However, multiple participants with varying needs often bring complexity to a program that can potentially result in cost increases. A recent RAND report on the F-35 indicates attempts to accommodate the requirements of multiple program participants, “leads to greater program complexity, increased technical risk, and common functionality or increased weight in excess to that needed for some variants, potentially leading to higher overall cost and unwelcome design and performance penalties.”¹⁶ For international programs to benefit from economies of scale and shared RDT&E costs, the participants need to have similar and stable aircraft requirements.¹⁷ The program must balance the complexity caused by multiple participants against the benefit of sharing costs, and ultimately reduce overall program risk by building partnerships based on similar performance needs.

International programs open foreign markets for aircraft sales as well as access to foreign aerospace companies. Including foreign companies in aircraft acquisition programs increases the pool of competitors and creates a potential for reduced supply or manufacturing costs. Some F-

35 subcontractors found better value from overseas manufacturing due to their labor rates.¹⁸

How one selects companies for program participation also affects cost. Industrial engagement strategies in the F-16 and F-35 used different approaches with varying results. The F-16 used a work share or offset concept which established a pre-agreed percentage of industrial participation for each nation. Contracts were not always awarded based on best quality or cost, but to ensure equitable industrial allocation. This strategy complicated program management with the additional task of monitoring and executing specific percentage work shares.¹⁹ The work share strategy led to increased manufacturing costs by selecting supplies based on industrial participation percentage.²⁰

Conversely, the F-35 program is using a contract award strategy of 'best value.' Contracts were awarded on best quality and cost rather than on a prearranged percentage. According to the US Department of Defense, "the best value approach requires industrial partners, whether international or domestic, to qualify for participation through demonstration of world-class products and technologies representing cost advantages to the program. Once Lockheed Martin and its top-tier partners have chosen a supplier, they will pursue sole source contracts with these companies based on schedule, performance and cost benchmarks. If the suppliers do not meet these benchmarks, they open themselves to re-competition."²¹

While best value strategy should provide better quality and reduced costs by allowing open market competition, the process does introduce some political and program management challenges due to varying participant industrial capabilities. Industrial participation is a greater priority for some of the F-35 partner nations than the aircraft requirements themselves.²² A perception of not getting an appropriate amount of industrial participation could be problematic. In at least one instance the F-35 program deviated from the best value approach to appease a

partner, categorizing the decision as strategic sourcing. Strategic sourcing allowed the program to award a contract to one partner to bolster their support and participation in the program. This deviance led to concerns from other partners.²³ Program management was forced to balance their best value approach, designed to provide the best price for the program, with the need to appease an individual partner to keep them in the program for other strategic objectives. Transparency in the process and maintaining a best value approach as much as feasible is essential to both achieving the program's best cost and managing participants' expectations.

International participation in fighter acquisition programs has resulted in funding stability. US funding for the F-16 was more stable than other domestic-only programs primarily due to congressional and Department of Defense recognition of the international implications of funding changes.²⁴ Conversely, foreign participants may be impacted more by schedule delays and cost increases than the United States. The defense budgets of foreign participants are significantly smaller than the US defense budget and often run on a different budgeting timeline.²⁵ For example, the Norwegian defense budget is approximately 1 percent of the US defense budget.²⁶ These budgeting differences reduce foreign participant flexibility when responding to US funding or programmatic changes. For example, procurement changes are one of the customer-driven cost variables that can significantly affect program costs. Reduction in aircraft procurement can cause an increase in per unit cost for the remaining participants. Just as program funding stability is important for budget forecasts, so too is the forecast and stability of procurement plans to reduce the negative affect on other participants. Stable funding should be a priority in all programs, but its importance is more significant in international programs as other nations may not be able to absorb cost increases nor react promptly to funding changes due to their budgeting cycles.

One of the most significant economic benefits for foreign participants has been the return on investment due to industrial participation. Although true financial benefit for the partners in the F-35 program will not be known until program completion, estimates at the start of System Development and Demonstration for return on partner investments (without foreign military sales consideration) ranged from 25 percent to over 100 percent. This equates to roughly \$5 to \$40 of revenue return for every dollar invested.²⁷ Continued industrial participation in Foreign Military Sales (FMS) aircraft production will only add to the revenue return.

To achieve maximum economic benefit from international fighter acquisition programs one should build a coalition of participants with like-aircraft needs and requirements. The program should utilize domestic and international sources for supply and production with a best value strategy to achieve the best quality for the best price. A program should seek participants with like industrial capabilities as well as stable economies for funding stability and to alleviate program complexity related to industrial expectations.

Industrial Base Considerations in International Acquisition Programs

The US *National Military Strategy* emphasizes a need to maintain technological superiority and an industrial base to meet the capacity and capability needs of US forces.²⁸ Unfortunately, the US industrial base has been reduced significantly in the past three decades. A recent RAND study notes an association between joint aircraft programs and a reduction in fighter producing companies. Since 1985 the number of fighter aircraft prime contractors has shrunk from eight to just three. Such a change has a potential to reduce competition and innovation while increasing cost.²⁹ Rather than pursue joint acquisition programs as an avenue for cost savings, programs should seek acquisition partners with similar aircraft needs from the

international community opening access to foreign markets for aircraft sales as well as foreign industrial participation and competition.

Opening aircraft acquisition programs to international industrial participation increases the pool of potential customers and subcontractors and strengthens ties between domestic and foreign defense industries. Reciprocal access to defense markets increases competition and inspires innovation, strengthening the greater industrial base.³⁰ In the F-35 program, “transnational links are already being forged among the partner countries and their companies which will yield untold international defense industrial alliances, market access, and technology spin-offs.”³¹ As an example, Turkey's TUSAS Engine Industry (TEI), which was working with a US engine company in support of F-35 engine development, has led to additional contracts for commercial engine parts.³² US industries have benefited from partner nation manufacturing practices, to include process control and lean manufacturing methods.³³ A recent Department of Defense study of international industrial participation highlighted two important lessons. First, “innovation typically comes from smaller, second- and third-tier suppliers of the scale of many of our partner country companies and second, the United States does not have the global monopoly on good ideas.”³⁴ Fighter acquisition programs need to take advantage of the increasingly interconnected global economy to enhance the US industrial base and gain access to the most advanced technologies.

Industrial participation has been a driver for foreign participants in past fighter programs as it can have long term affects beyond the initial procurement of aircraft. International programs that include subcontracting work in support of other FMS programs can entice partner participation. Such an arrangement contributed to partner country economic gain in the F-16 program and influenced Norway to participate in F-35. Norway estimated greater industrial

participation in the Eurofighter program but elected to participate in the F-35 program due to the lower aircraft cost and potential for greater total future aircraft sales.³⁵

While there are numerous illustrations of where expanding the industrial base to incorporate foreign industries can be advantageous, developing more than one production line is an example that may not be cost efficient. The F-16 program established two overseas production facilities as part of the original cooperative agreement, requiring redundant production equipment from the start. Additionally, due to different labor practices and regulations, more complex tooling was required to maintain the same amount of production in Europe as at the US facility. As a result, the program experienced increased tooling costs.³⁶ The complexity of multiple assembly lines, transportation of parts, international contract coordination, and more complex program management generally make multiple aircraft production lines more expensive.³⁷

Foreign participation in US fighter acquisition programs can help bolster the US industrial base and foster stronger international industrial bonds. Foreign industrial opportunities in US led programs, which can result in significant return on investment, are a major influence for some nations. However, not all opportunities are advantageous, as the discussion of duplicative production lines demonstrates.

Technology Considerations in International Acquisition Programs

Being at the forefront of technological and industrial innovation has ensured the United States maintains parity or an advantage over its adversaries, contributing to the overall national defense. Given the rate of technological advancement and globalization, the United States must look beyond domestic capabilities and consider the global market for the latest technologies, industrial techniques and military capabilities. One avenue for access to foreign technologies is

through international collaborative acquisition programs.³⁸ Traditionally, technology transfer has been a significant influencing factor that enticed foreign nations to participate in United States led acquisition programs.³⁹ Although a paradigm shift, the United States should view international programs in the same way.

Through technology sharing, nations can gain access to advanced technologies they may not have been able to develop on their own or at a fraction of the cost of their own development efforts. While the United States has traditionally been at the forefront of such development, other nations can provide capabilities the United States has yet to achieve.⁴⁰ The F-35 program has increased US access to the best technologies from foreign participants.⁴¹ Advanced technologies beneficial to the United States extend beyond aircraft capabilities themselves, and include manufacturing process control and lean manufacturing methods that may enhance the US industrial base.⁴² Such technological advancements and the knowledge gained by international program participants can be used in other manufacturing projects resulting in spill-over products and additional economic benefit from other commercial endeavors.⁴³

While technology transfer offers great opportunity for all participants in an international acquisition program, technology transfer also brings challenge and risk. In the F-35 program "the transfer of technologies necessary to achieve aircraft commonality goals is expected to far exceed past transfers of advanced military technology and will push the boundaries of US disclosure policy."⁴⁴ When faced with disclosure challenges a program may be forced to resource the work to a domestic company or receive a waiver to the disclosure restriction. Both could have a negative impact on US technological advantages or delays in program execution resulting in greater costs. The F-35 program has requested exceptions in the past to avoid additional development costs. In such cases the "technology transfer decisions have been

influenced by JSF program goals, rather than adjusting program goals to meet current disclosure policy.”⁴⁵

Advanced planning related to disclosure and export licensing is crucial to ensure a thorough review, protection of technology, and fair industrial participation by foreign partners. Past programs have experienced cost and schedule problems as a result of poor planning.⁴⁶ Some F-35 participants believe late export licenses have prevented them from bidding on subcontracts.⁴⁷ Efforts like a global project authorization (GPA) should enable US companies to more efficiently and timely process export authorizations. GPAs provide ‘umbrella’ export authority for some technologies greatly reducing the process for technology export approval.⁴⁸

An additional risk is third country transfer of technology. Prior to release of technology to foreign participants of international programs, the foreign country must agree to secure and not to transfer the technology.⁴⁹ Unfortunately, there have been verified instances of agreement violations and the technology was sold on the international market.⁵⁰ As a result, some advanced technologies will not be shared to ensure the United States maintains a competitive edge. For example, the United States will not sell the F-22 to foreign nations.⁵¹

Despite the challenges and risks associated with technology transfer, the United States has benefited from such arrangements. Program managers should consider technology transfer in international programs to enhance allied and US capabilities with the understanding that some technologies are vital and will not be shared. Advanced planning for disclosure authorization and export licensing, as well as partnering with the closest allies can reduce risk when sharing technology.

International Relations Considerations in International Acquisition Programs

International politics, or rather relations, is the last variable to be addressed and is

arguably the most important and most complicated. International acquisition programs strengthen international relations which in turn support the US' national security interests of building stronger international cooperation to promote peace and security in order to meet global challenges.⁵² It is for political reasons that the United States shares technology, industrial participation, and contributes to economic growth in allied nations through collaborative acquisition programs. The challenge is that political ties are based on relationships which are subjective, difficult to measure, and have the potential to change quickly.

International programs strengthen alliances through multiple levels of engagement. Programs like the F-16 and F-35 require continual liaisons between governments, defense departments and ministries, military services, and industry. Foreign made components on fighter aircraft require continued relations to ensure access to replacement components. Fighter acquisition programs require significant economic investment making it more likely countries will continue once invested in the program. It is international engagement, industrial reliance and economic partnerships that the United States leverages to expand foreign relations.⁵³

Improving coalition military capability through collaborative acquisition programs enhances military capabilities and political influence through a greater alliance. International fighter acquisition programs give our allies access to the most advanced capabilities and increase interoperability with US forces. International acquisition programs may also include US assistance for training, maintenance and operations personnel, allowing further engagement and collaboration at the tactical level. Future US operations will most likely be executed as part of a coalition based on existing alliances, not only to expand the military resources available, but with the strategic intent of increasing perceived legitimacy of action. A more capable, interoperable

alliance supports the US national security interests of global peace and security, as well as protecting the nation's vital interests.

Although international acquisition programs can promote and advance international relationships, they can also create risk. The addition of participants brings added aircraft requirements and more demanding coordination for program management which can increase the complexity of aircraft and program execution. As a result, more complex programs often lead to program delays and increased costs.⁵⁴ Program management will need to balance the expectation and needs of all participants while minimizing the impact to cost, schedule, and performance, and continuously evaluate the political implications that could result from programmatic decisions that affect partnerships.

The United States must also consider the potential of an acquisition partner becoming an adversary in the future.⁵⁵ The risks of such a scenario include technology transfer, reverse engineering, and the ability to counter US capabilities.⁵⁶ In the case of the F-35, the United States has established an economic, industrial and military hardware partnership with eight nations that may span 50 years. While a 50-year partnership appears to bolster political ties, there are no guarantees that an ally of today will be an ally for the duration of the program. The F-35 program has shared some of the nation's greatest technological advancements to make allies more lethal and survivable; however, the clear risk is that political change in a nation could give our adversaries insight on potential US vulnerabilities. Iran was one of the first Foreign Military Sales arrangements in the F-16 program and they planned to purchase 160 aircraft. After the aircraft were ordered, but before delivery, the country's political leadership changed and the resulting unfriendly relations with the United States resulted in cancellation of the

aircraft transfer.⁵⁷ International fighter acquisition programs should seek partners with stable political and economic relationships.⁵⁸

The loss of autonomy or national sovereignty is an additional concern of participants in international programs.⁵⁹ Relying upon foreign nations for aircraft parts makes a nation vulnerable to the influence of the part supplying nation. “A self-reliant aircraft industry precludes vulnerability to other nations that supply military aircraft and parts and might want to apply economic or political pressure.”⁶⁰ To counter this concern and reduce program risk, one should partner with nations with common political views and economic standing.

While international programs may strengthen political ties between participating nations, such programs are more complex. Great effort must be exerted to maintain relations within the program as well as between nations during the duration of the program. Participating nations should be selected based on close political ties. As the production of aircraft become more dependent on international industries, international relations may be used to influence use of the weapon systems.

Recommendations

- **First recommendation:** International participation should be evaluated through the variables of economic impact, technology transfer feasibility, industrial base, and international relations implications as it relates to supporting national security objectives;
- **Second recommendation:** The variables should be considered in relation to each other and not singularly. For example, international programs should not be entered solely in pursuit of reduced cost. In some cases the need to maintain capability superiority may prevent technology transfer. Additionally, the United

States may pursue international programs at greater cost than US-only programs to increase the capability and interoperability of allies;

- **Third Recommendation:** If cost and schedule are of significant importance, programs should be formed by partners with similar performance requirements. Programs with diverse requirements experience cost increases and schedule delays that surpass the economic benefits of combined development with less than desirable final products.



Conclusion

We now have the oldest Air Force fleet in history.

*Secretary of Defense Charles Hagel
Mr. Frank Kendall
17 September 2014*

The US Air Force faces a significant challenge in recapitalizing its aging fleet of aircraft. Declining defense budgets and increased cost of aircraft development have forced the service to look for more cost effective acquisition methods. Collaborative efforts, such as international participation in acquisition programs, should be considered as one of these methods. However, an international program cannot be solely evaluated on the traditional program variables of cost, schedule and performance. The variables of international economics, expanded industrial base, technology transfer, and international relations should be part of a more holistic assessment. Even after considering these more strategic focused variables, a thorough analysis may determine international participation is not feasible because the impact on program cost-schedule-performance is simply unacceptable in relation to the strategic advantages.

If international participation is preferred, there are numerous recommendations that program decision makers should consider. The most important of which is that in order to reduce program and aircraft complexity and reduce overall program risk, international programs should be established with a coalition of nations that have similar aircraft requirements. Program managers should also attempt to maximize the potential benefits of international partnerships and open industrial participation to all participants in order to access the best technologies and manufacturing processes using a best value sourcing and contracting strategy to achieve the best price. Program managers must be aware of the importance of industrial participation to foreign

partners and be transparent in program execution as a means to manage expectations. In addition to requirements, the United States should select participating nations based on close political ties and economic stability to reduce program risk. Lastly, it is imperative that impacts to international relations between participants must be considered during all program decisions, as managers cannot allow tactical program decisions to create strategic level issues between the United States and its allies.



Notes

¹ United States Department of Defense (DoD) Directive 5000.01, *The Defense Acquisition System*, 3.

² The programs began with like goals of producing affordable multi-role fighters for domestic and international procurement. The F-16 program started 40 years ago and has produced more than 4500 aircraft for 28 nations. With more than 138 configurations of the aircraft and ongoing production, the F-16 program is considered one of the most successful fighter acquisition programs in history. The F-35 program started in 2001 with plans to produce over 3000 aircraft for 12 different countries. As the F-35 program is still in its development phase, success or failure of the program has yet to be measured. Lockheed Martin, “F-16 Fighting Falcon,” www.lockheedmartin.com/us/products/fl16.html. Gertler, *F-35 Joint Strike Fighter (JSF) Program: Background and Issues for Congress*, 5-9.

³ Obama, *National Security Strategy*, 7.

⁴ *Ibid.*, 7.

⁵ *Ibid.*, 34.

⁶ United States Joint Chiefs of Staff, *National Military Strategy*, 18.

⁷ United States Department of Defense, *JSF International Industrial Participation*, 8.

⁸ Lorell et al., *Do Joint Fighter Programs Save Money?*, xviii.

⁹ United States Joint Chiefs of Staff, *National Military Strategy*, purpose page.

¹⁰ F-35 Joint Strike Fighter Program Office. *Joint Strike Fighter Production, Sustainment and Follow on Development Memorandum of Understanding*, 14.

¹¹ United States Department of Defense (DoD) Directive 5000.01, *The Defense Acquisition System*, 5.

¹² Wood, *International Military Aerospace Collaboration Case Studies in Domestic and Intergovernmental Politics*, 3.

¹³ *Ibid.*, 2.

¹⁴ Arena, et al, *Why Has the Cost of Fixed-Wing Aircraft Risen: A Macroscopic Examination of the Trends in U.S. Military Aircraft Costs over the Past Several Decades*, iii.

¹⁵ *Ibid.*, 79.

¹⁶ Lorell et al., *Do Joint Fighter Programs Save Money?*, 2.

¹⁷ *Ibid.*, xix.

¹⁸ Di Domenico, “International Armament Cooperative Programs: Benefits, Liabilities, and Self-inflicted Wounds, the JSF as a Case Study,” 33.

¹⁹ United States General Accounting Office, *Joint Strike Fighter Acquisition: Cooperative Program Needs Greater Oversight to Ensure Goals Are Met*, 15.

²⁰ Ibid., 15.

²¹ United States Department of Defense, *JSF International Industrial Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers*, 13.

²² Ozdemir, “Analyzing the Multi-national Cooperative Acquisition Aspect of the Joint Strike Fighter (JSF) Program,” 68.

²³ United States Department of Defense, *JSF International Industrial Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers*, 5.

²⁴ Rich et al., *Cost and Schedule Implications of Multinational Coproduction*, 6.

²⁵ Maxfield Associates, Ltd., *Lessons Learned through the F-16 Program by Virtue of the Multinational Involvement*, 2-II-5.

²⁶ United States Department of Defense, *JSF International Industrial Participation: A Study of Country Approaches and Financial Impacts on Foreign Suppliers*, 55.

²⁷ Ibid., 4.

²⁸ United States Joint Chiefs of Staff, *National Military Strategy*, 18.

²⁹ Lorell et al., *Do Joint Fighter Programs Save Money?*, xviii.

³⁰ Ozdemir, “Analyzing the Multi-national Cooperative Acquisition Aspect of the Joint Strike Fighter (JSF) Program,” 63.

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